SFA Modernization Partner

United States Department of Education

Student Financial Assistance

Technical Architecture Services Report
1Q FY02

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1 Introduction

1.1 Summary

The *Technical Architecture Services Report: First Quarter for FY 2002* summarizes the Integrated Technical Architecture (ITA) team's tasks related to implementing Task Order 69 during the first quarter of FY 2002. The ITA provides a standardized, reusable infrastructure for enabling business capabilities within the SFA application community. The long-term vision of the ITA is to provide an integrated, enterprise-wide technical architecture that will enable SFA to reduce the number of custom-built applications that are difficult and costly to update and maintain.

The ITA team's tasks fall into the following categories:

- Core ITA Support – Provides a standard development architecture / procedures for SFA application teams.
- Technical Architecture Support – Provides infrastructure and application architecture expertise to SFA application teams.
- Provide Roll Out Support – Build out of environments (development, test, staging, and production) and system upgrades for SFA application teams.
- Product Specialist Support – Provides support for specific software products used in SFA.
- Reusable Common Services (RCS) - Provides a set of reusable basic application services based on open-source technology and Java 2 Enterprise Edition (J2EE).

The rest of the report provides a description of the ITA team's tasks performed within these categories during the first quarter of FY 2002.

2 Support Areas

During the first quarter of FY 2002, the ITA team provided technical support to SFA in the following areas:

- Core ITA Support
- Technical Architecture Support
- Providing support during roll out.
- Product Specialist Support

The following sections describe the specific tasks the ITA team performed in these support areas.

2.1 Core ITA Support

2.1.1 Deliverables

The ITA team produced the following deliverables:

- The ITA Quarterly Report

2.1.2 ITA Operations

ITA operations during this quarter helped applications extensively in several aspects. ITA monitors applications such as IFAP, Schools Portal, and Data Marts and ensures their availability.

ITA also resolved several major operation issues during this quarter:

- ITA coordinated with CSC to make modifications on the WebTrends Reporting server for IFAP. Originally, WebTrends was not able to report end-user browser-type information because the inputting web server log did not capture such information. ITA worked with CSC to enable (user-agent) access to the web server in order to obtain WebTrends reports. After this change, WebTrends started to report user browser-type information. However, aside from user browser-type information, WebTrends also showed Proxy Server, spiders, and other HTTP requesting entities on the report. ITA refined this report by applying a filter to only include user browser-type information.

- ITA diagnosed and resolved Autonomy search engine issue on IFAP and Schools Portal. Before the fix, Autonomy search engine on both IFAP and Schools Portal returned irrelevant search results using certain search key words. The issue resolution was a major effort. This issue turned out to be a compounded problem that involved several iterations of fixes. The ITA modified Autonomy configuration files, re-indexed Autonomy databases, and eventually reinitialized Autonomy databases. The re-initialization process proved to be successful and the issue was closed in November.

- The ITA continued to refine Autonomy search engine on both IFAP and Schools Portal. Enhancements such as result representation, specifying weighting on certain key words, and adding new Autonomy databases.

2.1.3 Current SFA Applications and the ITA Environment

This table shows the SFA applications running in the ITA environment with RCS components:

Application	Migration to ITA	Development	Test	Test	Staging	Production	WebSphere	Server	Autonomy	Informatica	Interwoven	MicroStrategy	JRun	Viador	Oracle 8i	Email	Logging	Exception	Factory	Search	Persistence
		Environments					**Architecture**									**ITA RCS Components**					
Existing Applications																					
CFO Datamart	October 2000	X				X				X		X									
IFAP	October 2000	X	X			X	X	X	X		X				X		X	X		X	
Intranet R2	October 2000	X	X			X	X	X							X						
Schools Portal	October 2000	X	X			X		X	X		X		X	X	X						
DLM	January 2001	X				X				X											
FAFSA 5.X	March 2001	X					X	X							X						
FP Datamart	March 2001	X				X				X		X									
FAFSA 6.0	June 2001	X	X	X	X		X	X							X		X				
EAI	June 2001	X	X			X	X	X									X	X			X
eCampus Based Systems	June 2001	X	X	X		X	X	X							X	X	X	X			X
Enterprise Portal	September 2001	X					X	X	X						X		X	X		X	X
Exit Counseling	October 2001	X			X	X	X	X													
FARS Retirement	October 2001	X																			
Ombudsman Queries	October 2001	X			X	X	X	X													
Policy Guidance DB	October 2001	X					X	X			X						X	X		X	

2.2 Technical Architecture Support

2.2.1 Technical Support

The ITA team provided technical support and change requests for the FAFSA, eCB, and Consistent Answers application teams. Examples of this type of support include restarting servers, updating configurations, adding new configurations, and debugging problematic application code.

2.2.2 Architecture Operation Support

The ITA team provided the following production support for the IFAP, Schools Portal, and CFO & Financial Partner Data Mart:

- Troubleshooting of WebSphere, Viador, IHS, Autonomy, and Network Dispatcher issues.
- Monitoring of core application processes within the production ITA
- Providing assistance with updating Autonomy to fit the application teams' needs as well as providing estimates for enhancement requests from the teams.

2.2.3 COD/ XML

COD team required the ITA team's expertise in XML to provide assistance in the completion of the XML Schema design for the Common Record. This included edits to satisfy the reviews and feedback of the larger student aid community, including PESC (Postsecondary Electronic Standards Council) and FFEL (Federal Family Education Loan) lenders. The ITA team also worked with the COD team on the detailed requirements gathering, design walkthroughs, and development of business data transformations (XML to/from Flatfile) functionality in Java.

2.3 Roll Out Support

2.3.1 ITA Environments

The ITA team built the following environments on WebSphere Application Server, IBM HTTP Server, and Oracle database:

- Development environment on SUN for Ombudsman
- Development, test, and production environments for Exit Counseling
- Development environment for Students.gov
- Development environment for Policy Guidance
- Development environment for Enterprise Information Portals (EIP)
- Beta/Production, demo, development, production environments for FASFA
- WebSphere 3.5.5 upgrade for FASFA

In addition, the ITA team:

- Installed Digital certificates to enable Secure Socket Layer (SSL) support for Rational software and CM Data Mart

2.4 Product Specialist Support

2.4.1 SFA Application Team Support

The ITA team participated on all eleven FAFSA performance tests. The ITA team helped FAFSA to resolve the following issues:

- FAFSA observed 26 mb/s throughput limitation on 42 mb/s line.
- Tune web server to optimize performance.
- Tune application servers to get optimize performance.
- Research the operating systems to determine the appropriate configurations for kernel parameter settings.
- Determine Web server to Application server ratio.
- Determine the number of clones for production.
- Determine right configuration of Memory and CPU for each web/application server.
- Assisted FAFSA with capacity planning for production
- Determine the appropriate web server and application server configuration to support 3000 users (short pacing 1000 users).
- Determine the number of connections available in production and configure the shadow direct datasources accordingly.
- Determine the web server and application server usage (e.g. how much they are utilized).

ITA also submitted the following deliverables to FAFSA based on the performance testing:

- Eleven performance test reports – performance analysis of web server, application server, and network dispatcher.
- Webserver, application server, network dispatcher configuration documents – Contains all configuration parameters for optimum performance.
- Performance environment summary document – Contains all IP addresses of servers, directory structures, and URLs of the performance environment.

2.4.2 Interwoven Support

The ITA team built new Interwoven environments for the Policy Guidance Database and Portals teams. This included configuring TeamSite to utilize templating and data records. The ITA team also provided troubleshooting support for the existing applications utilizing Interwoven, which includes IFAP, Schools Portal, and the Intranet team, and assisted the application maintenance team with Interwoven enhancement requests.

2.4.3 Rational ClearQuest

During the development and testing phases of Common Origination and Disbursement (COD), it became apparent that there was a need for a problem/issue management tool to track all bugs and issues. The ITA team addressed this need by creating a ClearQuest database for the COD team to use for issue tracking.

2.4.4 Performance/Load testing tool

The ITA team began researching options to bring application performance testing skills and capabilities into the team. We also investigated the infrastructure that would be needed to support such an environment. The ITA team met with the Portals, Consistent Answers, and eServicing teams to discuss performance testing requirements. A recommendation was made to purchase Mercury LoadRunner for all projects and build the performance testing infrastructure within the VDC. The build out of this environment will take place in January and February.

2.4.5 IBM WebSphere

The ITA team provided troubleshooting assistance to all teams utilizing WebSphere. This includes code and performance issues. Reviewing log files and code structure played a key role in assisting application teams with getting their applications to perform correctly.

2.4.6 Rational Software Suites

Prior to Task Order 51, the ITA team had implemented Rational ClearQuest and ClearCase for the CIO teams. Rational Software Implementation Team, Task Order 51, is now responsible for rolling out Rational software (RequisitePro, ClearQuest, and ClearCase) for SFA application teams as part of standard development tools for the enterprise. Given this new task order, the ITA team transferred its knowledge and responsibilities to the Rational Software Implementation team.

2.5 ITA Reusable Common Services

In ITA Release 2.0, the ITA team developed the following Reusable Common Services (RCS):

- Logging – Enhances the current logging ability of the ITA Web application servers (specifically WebSphere), by allowing developers to dynamically set logging and tracing functionality without modifying tested source code.
- Exception Handling - Allow WebSphere-based applications to share standard error handling and error logging procedures. The service will also enable applications to throw a common, unified set of exceptions.
- Mail - Provides application developers with a common way to generate and send e-mail messages from Java applications.
- Persistence – Provides services that interact with application databases to create, retrieve, update, and delete business objects.

- Component Factory - A producer of objects that accepts some information about how to create an object, such as a reference, and then returns an instance of that object.
- Search - Consists of classes that provide a common way to for Java applications to access the Autonomy HTTP API and utilize its features.

The ITA team is in the process of designing two RCS:

- XML Reader / Writer - Support for reading / writing of XML documents and mapping them to specific Java classes.
- Job Scheduler - Support for activating batch programs.

The following RCS components are planned for ITA Release 3.0:

- Servlet - support the building of web applications with Java Servlet and JavaServer Pages (JSP) technology using Struts.
- Object Pooling - provides the capability for sharing different types of instantiated Java objects.
- Session - provides the context management service that stores a users temporary data during their HTTP session.
- Configuration - provides access to configuration parameters (in Properties files or XML) and initializes application frameworks.
- JSP Tag Libraries - Extensive JSP tab library supporting presentation layer.
- Technologies enabling web services:
  - Simple Object Access Protocol (SOAP) - APIs that facilitates SOAP implementation for Web Services.
  - Universal Description, Discovery and Integration (UDDI) - APIs that support registration of Web Services.

2.5.1 ITA Common Services – Portlets

The Modernization Partner Portal Strategy effort was tasked with the following:

- Migrate the SFA Schools Portal application into the WebSphere development architecture
- Develop seven portal components (portlets) which will provide standard functionality for reuse in the development of future SFA portal applications. The seven portlets are:
  - Logon
  - Registration
  - Personalization
  - Search
  - Headlines
  - Calendar
  - Feedback
- Deliver final portlets to the ITA team
- The ITA team is responsible for ensuring the quality and providing rollout support

The ITA team received deliverables from the Schools Portal Strategy project (code and documentation). The portlets are based on Apache Struts framework. Struts is an open source Model-View Controller (MVC) model 2 framework developed by the Apache Jakarta project group. It allows JSP / Servlet writers the ability to fashion their web applications using the MVC model 2 design pattern. The Jakarta project, sponsored by the Apache Software Foundation provides support for the Apache community of open-source software projects.

After examining the code and documentation, it was determined that enhancements are required before the Portlets are ready for application use as reusable components. The ITA team is currently in the process of enhancing the code and documentation. The Students and Financial Partners Portal applications team will use all seven portlets and five RCS components (logging, exception handling, email, search, and persistence) in their Release 1.0 implementation which goes live in April 2002.

The following highlights the main enhancements that will be made to each of the seven portlets:

Logon

- Componentize / de-couple from other portlets
- International language support (Spanish)
- Data model
- Additional validation rules
- Temporary password functionality for forgotten / expired password
- Email capability
- Password generator
- Documentation

Registration

- Componentize / de-couple from other portlets
- International language support (Spanish)
- Data model
- Additional security policies
- Documentation

Personalization

- Componentize / de-couple from other portlets
- International language support (Spanish)
- Data model
- Documentation

Search

- Componentize / de-couple from other portlets
- International language support (Spanish)
- Data model
- Documentation

Headlines
- Componentize / de-couple from other portlets
- International language support (Spanish)
- Display start date and end date functionality
- Data model
- Documentation

Calendar
- Componentize / de-couple from other portlets
- International language support (Spanish)
- Data Model
- Simplify presentation code logic
- Documentation

Feedback
- Componentize / de-couple from other portlets
- International language support (Spanish)
- Database support
- Survey functionality
- Data model
- Documentation